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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,447	10/26/2001	Timothy J. Dalton	FIS920010239US1	3611

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EXAMINER

LEWIS, MONICA

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 09/27/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

10/002,447

Applicant(s)

DALTON ET AL.

Examiner

Monica Lewis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 18 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the application filed October 26, 2001.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-9 and 18, drawn to a semiconductor structure for laser programmable fuse, classified in class 257, subclass 529.
 - II. Claims 10-17, drawn to the method for facilitating soldering to an element, classified in class 438, subclass 215.

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

A telephone call was placed to Sean F. Sullivan on September 9, 2002 which resulted in a provisional election being made without traverse to prosecute the semiconductor structure for a laser programmable fuse, claims 1-9 and 18. Affirmation of this election must be made by applicant in replying to this Office action. Claims 10-17 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Objections

3. Claim 4 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. There is no liner disclosed in claim 1.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3, 5 and 18 are rejected under 35 U.S.C. 103(a) as obvious over Lee et al. (U.S. Patent No. 6,300,233) in view of Agarwala et al. (U.S. Patent No. 6,033,939).

In regards to claim 1, Lee et al. ("Lee") discloses the following:

a) a conductive layer (20), said conductive layer completing a conductive path between wiring segments (10 and 30) included in a wiring layer (See Figure 2A); and

b) the fuse structure is blown open by application of a beam of laser energy thereto (See Column 1 Lines 50-54).

In regards to claim 1, Lee fails to disclose the following:

a) an organic material encapsulated underneath said conductive layer.

However, Agarwala et al. ("Agarwala") discloses the use of polyanilines (See Column 7 Lines 5-23). It would have been obvious to one having ordinary skill in the art at the time the

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invention was made to modify the semiconductor device of Lee to include the use of polyanilines as disclosed in Agarwala because it is passive to corrosion.

In regards to claim 3, Lee fails to disclose the following:

a) organic material is selected from a group that includes a polyimide, a polyamide, a polyarylene ether, a polyaromatic hydrocarbon (PAH), and a conductive polyaniline.

However, Agarwala discloses the use of polyanilines (See Column 7 Lines 5-23). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Lee to include the use of polyanilines as disclosed in Agarwala because it is passive to corrosion.

In regards to claim 5, Lee discloses the following:

a) conductive layer is selected from a group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom (See Column 3 Lines 43 and 44).

In regards to claim 18, Lee discloses the following:

a) an electrically conductive material (20), said electrically conductive material completing a conductive path between wiring segments (10 and 30) included in a wiring layer (See Figure 2A);

b) electrically conductive material further filling a pair of vias formed within an insulating layer (15), said pair of vias extending down to said wiring segments (See Figure 2A); and

c) the fuse structure is blown open by application of a beam of laser energy to said electrically conductive material (See Column 1 Lines 50-54).

In regards to claim 18, Lee fails to disclose the following:

a) an organic material.

However, Agarwala discloses the use of polyanilines (See Column 7 Lines 5-23). It would have been obvious to one having ordinary skill in the art at the time the invention was

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made to modify the semiconductor device of Lee to include the use of polyanilines as disclosed in Agarwala because it is passive to corrosion.

6. Claims 2, 4 and 6-8 are rejected under 35 U.S.C. 103(a) as obvious over Lee et al. (U.S. Patent No. 6,300,233) in view of Agarwala et al. (U.S. Patent No. 6,033,939) and Stamper (U.S. Patent No. 6,111,301).

In regards to claim 2, Lee fails to disclose the following:

a) a liner material in electrical contact with said wiring segments and said conductive layer, said liner material further encapsulating said organic material between said wiring layer and said conductive layer.

However, Stamper discloses the use of liners (See Column 2 Lines 45-65). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Lee to include the use of liners as disclosed in Stamper because it is resistant to corrosion and aids in separating the wiring.

In regards to claim 4, Lee fails to disclose the following:

a) liner material is selected from a group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom.

However, Stamper discloses the use of liners (See Column 2 Lines 45-65). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Lee to include the use of liners as disclosed in Stamper because it is resistant to corrosion and aids in separating the wiring.

In regards to claim 6, Lee discloses the following:

a) a pair of vias formed within an insulating layer (15) and extending down to said wiring segments (See Figure 2A); and

b) a mesa region of said insulating layer formed between said pair of vias (See

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Figure 2A).

In regards to claim 6, Lee fails to disclose the following:

a) liner material is formed upon sides of said mesa region and said wiring segments.

However, Stamper discloses the use of liners (See Column 2 Lines 45-65). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Lee to include the use of liners as disclosed in Stamper because it is resistant to corrosion and aids in separating the wiring.

In regards to claim 7, Lee fails to disclose the following:

a) pair of vias is filled with said organic material.

However, Agarwala discloses the use of polyanilines (See Column 7 Lines 5-23). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Lee to include the use of polyanilines as disclosed in Agarwala because it is passive to corrosion.

In regards to claim 8, Lee fails to disclose the following:

a) organic material further occupies an inner area of the fuse structure, said inner area between the top of said mesa region and said conductive layer.

However, Agarwala discloses the use of polyanilines (See Column 7 Lines 5-23). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Lee to include the use of polyanilines as disclosed in Agarwala because it is passive to corrosion.

In regards to claim 9, Lee fails to disclose the following:

a) conductive layer covers said inner area and said organic material, thereby completing said conductive path.

However, Agarwala discloses the use of a conductive layer (8) as a cover (See Figure 4). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Lee to include the use of a conductor layer as a cover as disclosed in Agarwala because it aids in providing communication among the various components.

Allowable Subject Matter

7. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: a) Takagi (U.S. Patent No. 5,252,844) discloses a semiconductor device having a redundant circuit; b) Bezama et al. (U.S. Patent No. 5,585,663) discloses a self cooling electrically programmable fuse; c) Stamper (U.S. Patent No. 5,955,773) discloses a closely pitched polysilicon fuses; d) Huang et al. (U.S. Patent No. 6,162,686) discloses a method for forming a fuse in integrated circuit; and e) Daubenspeck et al. (U.S. Patent No. 6,440,834) discloses a method and structure for a semiconductor fuse.


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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 703-305-3743.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 703-308-4940. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML

September 20, 2002


CARL WHITEHEAD, JR.
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